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NEW COMPLEXITIES: Photography in Cyberspace

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Abstract:

The aim of this paper, guided by Jorge Albuquerque Vieira's ideas of systemic permanence (2008) and Arlindo Machado's solid cores and areas of intersection (2010), is to show that photography, in its attempt to endure, migrates to cyberspace (with the Internet as the main environment) transforming – in relation to other systems – into new complexities. We adopt here the systemic permanence cited by Vieira and his "crisis of stability" process as key parameters of the survival of the photographic system.

Keywords: Photography; permanence; hybridization; Internet.

Introduction

Etymologically, the word "photography" comes from the Greek *phos* (light), and *grafis* (style, brush), and therefore, literally, it means *written with light* or *to write/paint with light*. According to the Michaelis Portuguese Dictionary, one of the concepts of the meaning of "photography" is: the art or process of producing, by the action of light, or any kind of radiant energy, on a sensitized surface, images obtained through a dark chamber.

The indexical characteristic of photography (Peirce, pp. 1839-1914) as copy, testimony and representation of a given reality was the main framework in its emergence. These aspects

permeated the second half of the nineteenth century. In parallel, the fragmentary context[1] of the photographic image extends to the second half of the twentieth century and from there, gradually, there has been a shift in paradigm. Photography, electronic now, has become interrelated with other systems, in new (digital) environments and, thus, drives the emergence of a new visuality/complexity. The photographic image, more than ever, is in constant motion.

It is a fact that today, with the advent of technology[1] and the increasingly rapid rise of the virtual world, a world created by digital technologies, with emphasis on the 1990s, with the convergence of media in cyberspace, having the Internet as the primary environment, our perception about the photographic image is changing. [2]Such coexistence of cultural systems and their relationships in cyberspace is sprouting a new fertility regarding electronic photography, in an evolutionary context. The picture is contextualized in time, which has been happening since its invention.

> Current technological innovations show an interpenetration of photography by other technical means, such as electrography, telecommunication, video and computer science. It is in this aspect that the origins of electronics-based photography lie, in the form of *a technical and aesthetic reinvention*. (Vincent, 2005, pp.322)

The Internet becomes a medium of exchange and mergers for radically different communication systems, forming a propitious environment for the emergence of new systemic and cultural exchanges.

In cyberspace, the coexistence and interaction of different technological systems reinforces what we know today as hybridization, where two distinct elements come together. With the concept of semiosphere (Yuri Lotman) we can classify [3]as clashes of culture or systems, enabling the formation of a new element. However, some authors, such as Irene Machado (2007), are concerned about the use of the term because, in biology, a hybrid is sterile, and in the explosive[2] virtual environment, where different technology/media systems meet, the term may not be well employed.

The emergence of a new element in the photographic system directly involves the very act of REPRESENTING – the primordial essence of the photographic system. The word itself – *represent* – is complex in meaning [4](based on its Latin root) as it regards the concepts of evolutionary processes addressed in this article. This is because it simultaneously involves a

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[1] Technically, photography is a fragmentary action; a fragment of time that allows light to receive chemical or electromagnetic support; the closing of the shutter guillotines continuous time, capturing a fragment of it. According to Susan Sontag (2007, pp.13) "To collect photographs is to collect the world", a world in fragments.

[2] The term "explosive", resulting from the text, refers to an environment of culture and system shock -- environment in constant motion.

gesture related to pre-existence, the noema "it was"[3] according to Roland Barthes (1984) (re-), associates with an examination of that which does not yet exist and of what might come to be (pre-), antecedes novelty, and transforms the act of definition, of establishment, of temporal permanence of the system (sent).

Photo Permanence

However, the very idea that photography is contextualized in time brings us back to what Jorge Albuquerque Vieira (2008), in his book *Theory of Knowledge and Art*[4] calls "Systemic Permanence":

> The problem of permanence as a basic systemic parameter is a problem in the Universe. The Universe, for some unknown **reason**, exists. And for another reason also unknown, it tries to continue to exist. We can cite it as a principle. It's cannot be an ontologically founded proposal, but it is a principle: the universe tends to remain. And if physics is right, in its thermodynamics of open systems, this permanence of the Universe, which occurs through its expansion, indicates the emergence of all other systems and controls the permanence all other systems. (Vieira, 2010, pp. 106)

The universe seeks to remain, hence all its subsystems - biological and cultural - are also compelled to remain. The permanence of the subsystems is a reflection of the permanence of the universe and every culture, therefore, needs to create mechanisms that go beyond the normal cycle of a human lifetime.

And in seeking to remain, the systems develop new intricacies, which is happening with photography, with greater emphasis on the explosive environments of cyberspace. In an attempt to endure, the photograph develops new complexities.

We can illustrate the idea of the evolution of the photographic system in the very concept that Vieira (2010) classifies as the concept of ***evolon*** (Figure 1). The photographic system, in its attempt to endure, clings to stability, at a given time, through its own internal fluctuations or those of the environment. The system enters a process of instability (systemic crisis) that drives a new stability – a moment of crisis which is established between the previous and next stages of stability.

[3] Translated from the Portuguese "isso foi"

[4] Translated from the Portuguese title: *Teoria do Conhecimento e Arte*

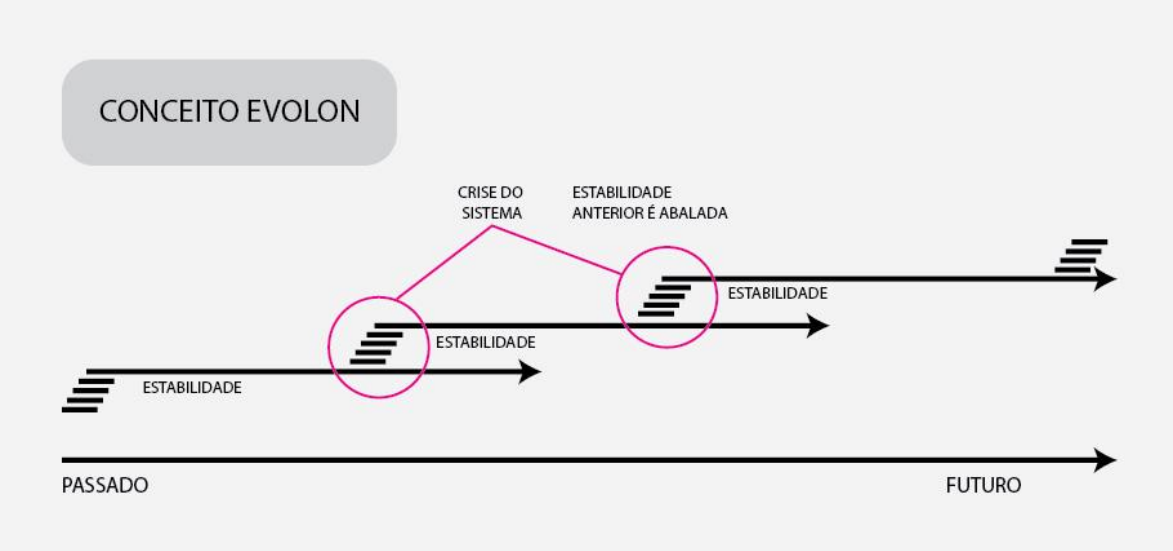

Figure 1 – The ***evolon*** concept

According to Vieira (2010):

> Because of this idea, the evolutionary process is not a smooth transformation, monotonic in time: the evolving systems "cling" to stability in their effort to remain. The environment has fluctuations. The system itself, depending on its complexity, has internal fluctuations. When these fluctuations "resonate" and certain typical parameters of the nature of the system are exceeded by critical values , there arises an amplification (a non-linear process) of fluctuation that throws the system into a stability crisis. (Vieira, 2010, pp. 60)

Perhaps we can say that today, in the midst of virtual (digital) environments, photography finds itself in a possible "crisis" in the search for an amplification of its technical and contextual concepts, aspiring to the emergence of a new complexity that will consolidate another step in its evolutionary scale. What happened, for example, in the criticisms surrounding issues of representation in the very emergence of photography, where some artists did not recognize an aesthetic value in photography at the level of art? What about the resistance, by some photographers, to the transition from analog photography to digital photography? In both cases, the boundaries were defined and characteristics indicated afterward.

> According to Mende, a sequence of ***evolons*** constitutes an evolutionary scale, by the repetitive transition from one steady state to the next. Achieving stationariness, or rather, metastability, is an imposition of permanence. (Vieira, 2010, pp. 60).

Systemic permanence seems to be the parameter that governs evolutionary processes. In the attempt to remain, those open systems permanently subject to crisis restructure and reorganize themselves, creating other complexities.

An open system can endure if three features are present:

1 "*It must have sensitivity, in order to respond appropriately and in time to the variations or differences occurring within it or the environment*" (Vieira, 2008, pp. 21). According

to the author, these chains of events that create processes are manifested to the systems as signals or streams of information;

2 "*The system must be able to retain part of this flow in the form of a relational collapse, from the progressive internalization of the relations born of its internal activity and contact with the environment*" (Vieira, 2008, pp. 21). The system here goes from merely perceiving a piece of information to, in the words of the author, "*perceiving it a certain way*", which, according to the author, refers to a function of transfer or memory function, as over time it gains greater flexibility as the system acquires higher degrees of complexity. "It is from memory, generalized here, that a system can connect its past, in the form of a story, with the transient present and possible futures" (Vieira, 2008, pp. 22);

3 "*Systems tend to endure; as they are open, they need an environment; to endure, they evolve, developing information based on a history* " (Vieira, 2008, pp. 22).

Based on these assertions and connected to the ideals of systemic permanence, we understand photography as part of an open system in which its principal technique for endurance is its ability to react to changes that occur in its environment, to retain the flow of information from memory and especially to evolve mainly based on its historical information, since according to the author, "*memory is a great evolutionary solution. Just as the genetic code preserves and propagates information, a work of art is maintained, evoked, transmitted by the culture of a people"* (Vieira, 2008, pp. 95).

A New Look at Photography

However, the idea of systemic permanence makes us look to the explosive environment of cyberspace, and especially to the new dialogues that the photographic system establishes with other systems. To make explicit the convergence of the arts and media, in the book *Art and Media*[5], Arlindo Machado (2010) proposes the idea of considering the universe of culture as a sea of events linked to the human sphere, and the arts or media as circles bordering a particular type of event. While it is impossible to define the radius of the circumference of these circles, we take as a base photography, film and video (which in the current study become relevant) as circles that retain these events.

Just as it has its particularities, each circle presented also has points of intersection with other circles. Its edges intersect the edges of other, overlapping and forming another constituent element of events, these created by the phenomenon of intersection (Figure 2).

[5] Translated from the Portuguese title: *Arte e Mídia*

The idea of intersection directly involves the concept of permanence and systemic hybridization already mentioned above, according to Machado:

> "(...) in these new times of instability of 'postmodernity', the split between the various levels of culture does not seem so clear. In our time, the world of culture is proving much more hybrid and turbulent than it has been at any other time. (Machado, 2010, pp. 24)[5]

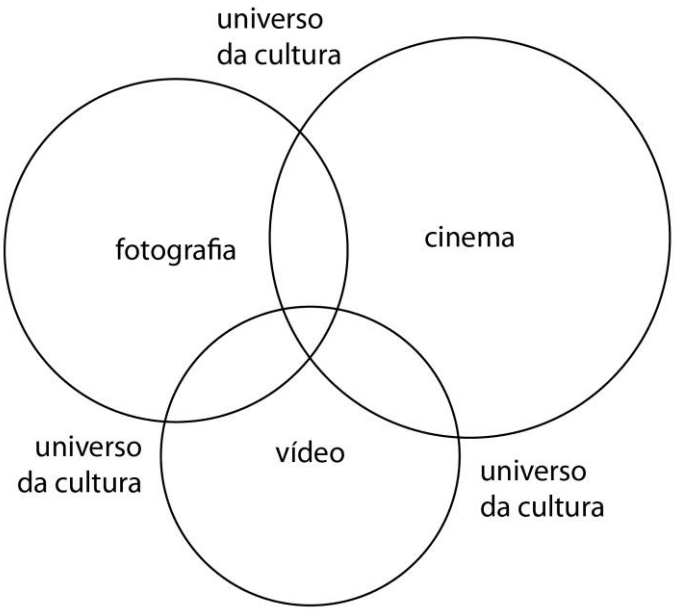

Figure 2 - Universe of Culture

"Figure 2" shows a direct relationship between various circles. It is impossible, for example, to talk about film without mentioning photography, or to think of film without mentioning video. In the specific case, the circles have a relationship of ontological and contextual dependency, as they are part of a common nature, even in a chronological process of evolution. But what we want to show is that in this universe of culture, the particularities clash, presenting a new visuality.

Machado (2010) further exemplifies this when he cites the idea of solid cores. According to the author:

> Each of these circles would be better represented if, instead of imagining it as a simple empty circle, we chose to imagine it as a circle filled with a graphic of variable density: denser in the center, less dense at the edges, thus creating a gradient with shades ranging from a black center to much lighter edges, fading to white. This dense center would represent the so-called "specificity" of each medium – that which distinguishes it as such and allows us to differentiate it from other means and other facts of human culture. Each circle would then have a solid core '[...]'. (Machado, 2010, pp. 59)

However, as we proceeded to the edge and intersection points, the differentiation between the media would not be so obvious, "(...) *the concepts that define them can be transported from one to another, the practices and technologies can be shared* (...)" (Machado, 2010, pp. 59).

Based on the thought of convergence, the idea of delimitation of circles eventually become obsolete, since the circles - here we point out cyberspace as support - can grow so intensely that even the solid cores start to merge and lose the quality of uniqueness (Figure 3).

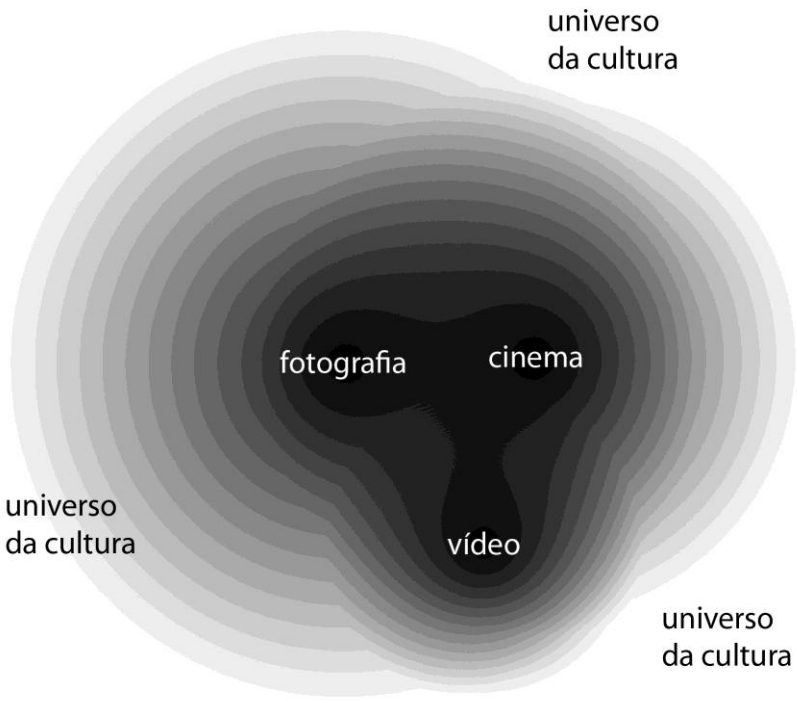

Figure 3 - Universe of Culture

> The repertoire of works produced in each circle expands in a geometric progression, and some, more revolutionary, redirect the course of thought and practice. This means that both circles and their "solid cores" undergo a permanent expansion and, in this expansion, their areas of intersection with other circles also expand. There comes a time when the expansion of the circles reaches such a magnitude that the intersection is not just around the edges, but also in their "solid cores". (Machado, 2010, pp. 64-65)

On the idea of convergence, there is a break with more traditional concepts in that the "solid cores", characterized by their uniqueness, mingle with other solid cores, until finally they cannot be differentiated and it becomes difficult to define, for example, what is a photograph and what is still a film. At this stage we find what Vieira (2008) calls the "crisis of system stability". From this point, the system becomes a new complexity, (re)introducing itself into its environment.

The examples of this are the new applications in concepts and techniques already discussed, such as "timelapse", "cinemagraphy" and 360 degree photos that are reinventing the use of the photographic image.

The first (Figure 4) corresponds to the capture of a "lapse in time", 10 seconds of video corresponds approximately 3 to 4 hours of photographic recording.

The technique, in a broad context, is made possible through the junction of photographic images and video editing software. Based on the "frame by frame" concept, images are grouped and organized, one after the other, creating a video fragment (unlike the stop-motion technique, which uses "frame by frame" animation with models of various materials such as modeling clay, for example).

"Timelapse" is a technique well known in the fields of cinema and photography, where the cutting edge lies in creating and manipulating ***HDR*** files - ***High Dynamic Range*** used in photography or image processing, allowing greater detailing of lighter areas, directly illuminated by a light source, as well as darker areas, possibly shadows. The processing of **RAW** files is also present and innovative in the production of "timelapse". This file is considered the "digital negative" in electronic photography and cannot be subjected to the lossy compression of information, as with JPEG files. Photos in JPEG format have a color depth of 8 bits per channel. This means that colors are processed from 0 to 255, from black to white, in each channel. Files with a 16-bit color depth have more color fidelity (including black and white) because they contain more color information in each channel. The interval between 8-bit and 16-bit images is called the dynamic range - much more detail and color fidelity is found in 16-bit images, simply because there is more information about the brightness of each pixel when we have a higher interval of brightness values in each channel. Because of this limitation, HDR images are made from RAW images, which usually have a color depth ranging between 30 and 32 bits/pixel.

Figure 4 - *Timelapse* - Patryk Kizny - http://vimeo.com/16414140 - Accessed 11/30/2012

In the second (Figure 5), we use the old concept of "animated GIFs" where particular elements in the photograph move amid a still image, producing an infinite loop.

Figure 5 - *Cinemagraph* - 2011 - Jamie Beck and Kevin Burg - http://cinemagraphs.com - Accessed 11/30/2012

The technique gives the illusion that the "viewer" is watching a video fragment, but the movement is limited to small gestures or movements of details like lighting and reflection.

The ***cinemagraph*** is commonly produced by taking a series of photographs and using image editing software to arrange them in sequential frames, such that an infinite loop is generated, often using the "GIF" file format to finalize the work.

And finally (Figure 6), more common, but just as important – especially with regard to the participation of the subject – is the process of creating the "Virtual Tour", where the interaction becomes the main factor in the dialogue between man and image.

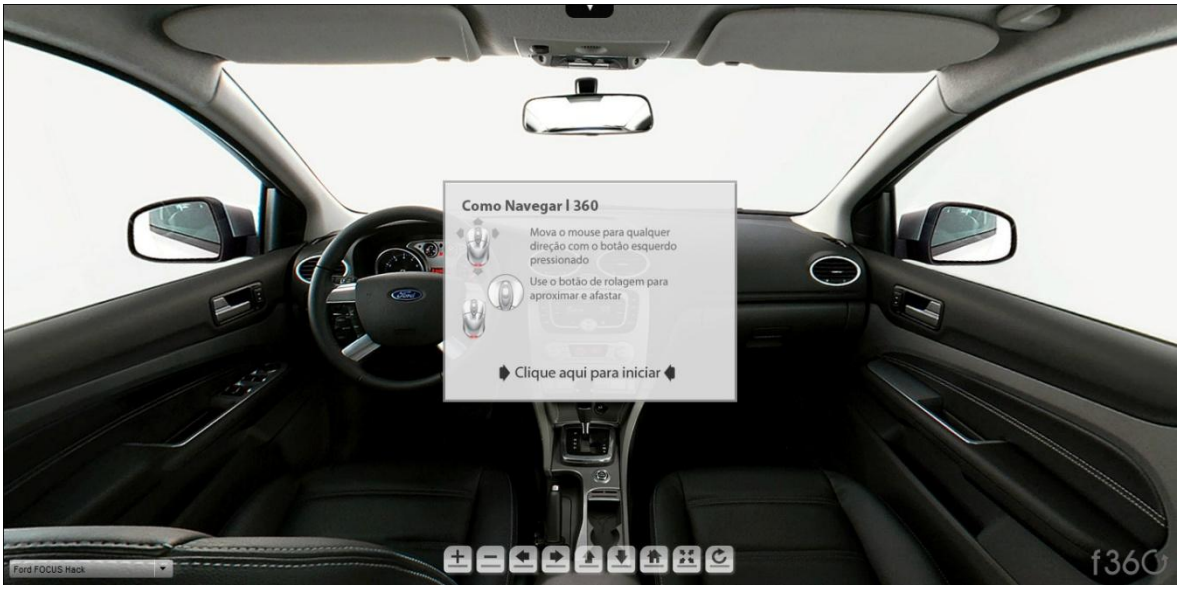

Figure 6 – Virtual Tour – http://fotos360.com.br/JOBS/05.MAIO/TOUR-VIRTUAL/carros/Ford% 20FOCUS/Ford 20FOCUS.html% – Accessed 11/30/2012

In the technical production of a "Virtual Tour", four steps are necessary:

1) Image capturing: a delicate process where at least 20 minutes are required for a 360° photo shoot; this picture consists of 16 or 22 pictures taken at two different angles on the same axis, from the same point of view. 20 minutes are necessary to calibrate the camera for photometry and lighting, frame by frame, often taking three pictures for each position – a style of photography called HDRI (*High Dynamic Range Image*), which can either generate realistic effects or an artistic bias;

2) Preparation of the spherical photograph: the first step in post-production. All RAW photos (file extension for semi-professional and professional cameras) are processed in specific software, turning the various photos into one spherically distorted image with a calculated horizon. In this process, treatment is also performed for all images;

3) Creation of augmented virtual reality: the most important step. This puts the photo in VRML format (Augmented Virtual Reality[6]), which enables authoring in other software for navigation in 360°;

4) Authoring and finalization: the phase in which links and files (photos, text, icons, etc..) are embedded, enabling Virtual Tour navigation. After this, the "Vitual Tour" is finished and in a format compatible with the parameters of the website where it will be hosted.

All these techniques significantly augment the effect of representation of reality and create a new form of interaction between subject and work, since the fragmentary ideas of photography are put to the test and what now prevails is the very idea of movement, in technical and contextual terms.

Notably, technology - with regard to photography – is heading towards a future where, increasingly, the subject who observes the work begins to fulfill a role of interactor, on the verge of participating in a way that modifies the work itself.

Final Thoughts

In its attempt to endure, the photographic system clings to stability. Today, this stability is again placed in "check" and the picture goes into a so-called "crisis of stability" – a key factor in the evolution of a system – and starts to migrate to digital media (cyberspace), having the Internet as its primary environment.

In this new environment that underlies the context of media convergence, photography relates to other systems, e.g., film and video. With this engagement, it develops new intricacies due to processes of hybridization[7].

It becomes evident that the crisis of open systems, in particular the photographic system, is a factor intrinsic to the process of existence and permanence. Thus, the complexity of the photographic system is presented in the form of a new visuality based on the intersection between multiple systems.

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